Materials Engineering Branch

TIP*

No. 127 A Release Film for Use with Thermal Control Compounds

Author(s): Fred Gross Contact: (301) 286-6882

Thermal control compounds are commonly used to conduct heat across two interfaces to achieve thermal balance in a spacecraft system. Specially formulated greases have been used in the past to achieve this goal. The use of these grease compounds should be avoided because of their undesirable properties that can compromise many space experiments.

In the last few years, thermally conductive silicone rubber sheet material and form-in-place, thermally conductive silicone compounds have been used successfully for heat transfer in flight experiments. The pre-formed sheet is simply cut to size and shape and most often used without further processing. In cases where there are surface irregularities or in packages where bowing might be experienced when bolting two surfaces together, the two-part, form-in-place silicone formulation is usually be employed.

Whenever black boxes or printed wiring boards (PWBs) are assembled and the form-in-place silicone is used, there is always the possibility of the necessity of disassembly one or more times. In the case of PWBs, in particular, there exists the possibility of damage when the disassembly is attempted because of the tenacious nature of the silicone compound. The Materials Engineering Branch has developed a simple solution to the problem and that is to place a Teflon release-sheet in the assembly. The Teflon film should be kept to minimum thickness. The recommendation is to use 0.5 mil sheet or less if available. The Teflon should be placed against the most sensitive surface. In the case of a PWB and a flat plate, it should be in direct contact with the PWB. It is desirable to place a few, small holes in the Teflon sheet to enhance the heat transfer. This will not affect the workability of the system. Each user of this technique may customize the details to fit the system used. This procedure is non-contaminating, safe and effective for flight hardware systems.